

SOME SPONDYLIDS FROM THE PACIFIC OCEAN (MOLLUSCA: BIVALVIA: SPONDYLIDAE)

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Spondylus swinneni sp. nov. is described and figured; the type of *Spondylus multimuricatus* Reeve, 1856 is figured and redescribed; *Spondylus hawaiiensis* Dall, Bartsch & Rehder, 1938 is placed in the synonymy of *Spondylus candidus* Lamarck, 1819; *Spondylus puniceus* Bernard, Cai & Morton, 1993 (nom. nov. for *Spondylus coccineus* Lamarck, 1819 non Schreibers, 1793) is discussed. □ *Spondylus*, new species. *Pacific Ocean*.

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Since publication of 'Spondylus, Spiny Oyster Shells of the World' (Lamprell, 1986), several important taxonomic changes have been effected within the Spondylidae (Lamprell, 1992a; Lamprell, 1992b; Lamprell & Kilburn, 1995; Skoglund & Mulliner, 1996; Lamprell, 1998; Lamprell & Dekker, in press; Lamprell & Willan, 2000; Lamprell & Healy, 2001). Thirteen new species have been described and several species listed in the book have been placed in synonymy. These changes were largely based on the results of extensive deep-water exploration off the coast of New Caledonia by the ORSTOM expeditions (Lamprell & Healy, 2001) and diving off the American coast and Solomon Islands. As a result there has been renewed interest shown in the group by collectors in Europe, Australia and other Indo-Pacific countries and consequently much more material from private collections has become available for scrutiny. The present study aims to rectify several additional taxonomic problems that have come to notice following examination of this material.

ABBREVIATIONS. QM, Queensland Museum, Brisbane; AMS, Australian Museum, Sydney; BMNH, The Museum of Natural History, London; MNHN, Muséum National d'Histoire Naturelle, Paris; MHNG, Muséum d'Histoire Naturelle, Geneva; USNM, United States National Museum, Washington; KL coll, Kevin Lamprell collection; PC coll, Peter Clarkson collection; lv, left valve; rv, right valve; pv, paired valve; NSW, New South Wales; WA, Western Australia; Qld, Queensland.

MEASUREMENT DETAILS. Height = greatest vertical distance between the centre of the umbo and the lowest part of the ventral margin of lv,

excluding spines. Width = greatest horizontal distance between the anterior and dorsal margins of lv, excluding spines. Depth of pv = greatest distance between the external surfaces of the left and right valves excluding the ribs and spines.

Family SPONDYLIDAE Gray, 1826

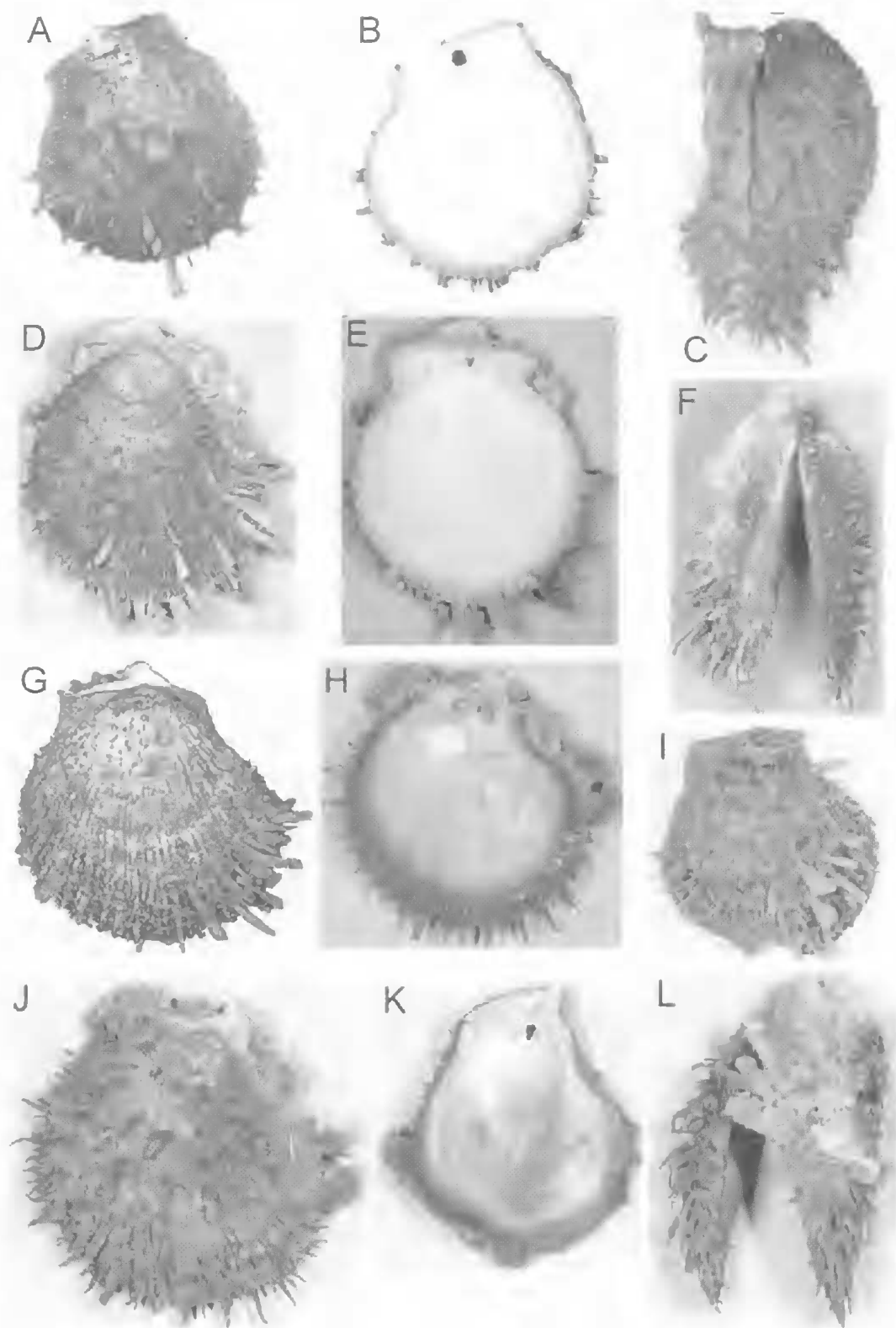
***Spondylus swinneni* sp. nov.**
(Fig. 1G-K)

Spondylus multimuricatus Reeve, 1856: Lamprell, 1986: 32; pl. 9, fig. 2a-b, non Reeve, 1856.

ETYMOLOGY. For Mr Frank Swinnen.

TYPE MATERIAL. HOLOTYPE: AMSC303105, Philippine Islands. PARATYPES: AMSC303116, northern Qld; QMMO66961, Finger Reef, Swains Reef Qld, off corals, 18m, P. Clarkson. OTHER MATERIAL. KL coll, 1 pv, Bonegi Wreck, Solomon Islands, 28.viii.85; KL coll, 1 pv, West of Honiara, Solomon Islands, dived, P. Clarkson; KL coll, 2pv, Gneering Shoals, south Qld, dived 6-30m, P. Clarkson; PC coll, 9pv, West of Honiara, Solomons, dived 7-50m, shipwrecks and reefs, P. Clarkson; PC coll, 1 pv, Santo, Vanuatu, 8m; PC coll, 1 pv, North West Reef, Exmouth, WA, 24m, P. Clarkson.

DESCRIPTION. Shell elongate-ovate to ovate, height to 125mm; lv moderately convex to flat, width of the auricles approximately half the height of the shell. Sculpture consisting of numerous radial ribs; interstices wider than the ribs with one or two minor riblets. Major ribs bearing numerous overlapping spines varying from short to moderately long, sharp, blunted or slightly spatulate, frequently curved inward and hook-like. Internally slightly excavated under the hinge; pearl white centrally, deep brown outer crenulated margin, orange to yellow-brown at the crenulations and lighter brown inner margin. Rv slightly more convex than the lv; ornamentation



of unattached areas consisting of evenly spaced radial ribs and dense overlapping spines, sharp and hook-like, rarely if ever blunt or spatulate. Cardinal area triangular; internally with a shallow excavation under the hinge plate and a strong, crenulated margin similarly coloured to the lv. Area of attachment variable with limited foliations supporting fixed area. Colour orange-brown with indistinct black lines and markings at the umbonal region; some specimens have black in the interstitial areas extending to the lower margin.

TYPE LOCALITY. Philippine Islands.

DISTRIBUTION AND HABITAT. Indo-Pacific, Solomon Islands, and northern Australia; cemented to ledges, overhangs, and cave walls, frequently along drop-offs festooned with gorgonian corals and subject to moderate currents, in 10 to more than 50m. Delicately sculptured specimens have been collected from sheltered positions within shipwrecks at similar depths.

REMARKS. Specimens of *Spondylus swinneni* sp. nov. have been confused with *S. multimuricatus* Reeve, 1856 in the past (Lamprell, 1986). However, compared with the latter species the hinge teeth of *S. swinneni* are finer and tinged with brown, the spines overlap and are not arranged concentrically, the ribs are more numerous and less prominent. The ornamentation of the lv of *S. swinneni* is of short to moderate length spines, deposited evenly on the ribs, and consistently sharp and hook-like (on the lv of *S. multimuricatus* the major spines are relatively broad and blunt while the species has a limited number of prominent ribs). *Spondylus swinneni* is also superficially similar to the sympatric *S. linguafelis* Sowerby, G. B. II, 1847. However, the shorter, spatulate or hook-like spines (longer and needle-like in *S. linguafelis*) readily distinguishes the new species.

***Spondylus multimuricatus* Reeve, 1856**
(Fig. 1A-F)

Spondylus multimuricatus Reeve, 1856: pl. 4, fig. 15; Fulton, 1915: 353, sp. 49; Abbott & Dance, 1986 (3rd ed.): 316.

TYPE MATERIAL. Specimen figured by Reeve, BMNH1998093/1 lectotype herein selected, Philippine Islands; paralectotype, BMNH1998093/2, same data as lectotype. Dimensions of lectotype: height 70.5mm, width 64.0mm, depth of pv 35.0mm. OTHER MATERIAL. KL coll, 1 pv, Koh Samui, southeast Thailand, Gulf of Siam; KL coll, 1 pv, Cebu Islands, Philippines, by dealer; KL coll, 1 pv, Heron Island, Qld, L. Newman; KL coll, 1 pv, Exmouth Gulf, north W.A, P. Clarkson.

DESCRIPTION. Shell elongate-ovate, moderately gibbous, height to 100mm. Sculpture of numerous weakly formed ribs, 5-6 of which are ornamented with irregular squamate, short to long spines; interstices with numerous minor radial ribs that are densely spined with minor spines; 2-3 interstitial ribs bear slightly larger sharp spines of varying lengths. Colour red-orange, orange or mauve with some purple at the umbonal area; internally white; crenulated margins deep-orange. Area of attachment variable.

TYPE LOCALITY. Philippine Islands.

DISTRIBUTION AND HABITAT. Philippine Islands; habitat unknown.

REMARKS. *Spondylus multimuricatus* was incorrectly figured by Lamprell (1986) and Springsteen & Leobrera (1986). The species figured by Lamprell, 1986 is *S. swinneni* sp. nov. (see above). The species figured by Springsteen & Leobrera (1986) is a specimen of *S. reesianus* Sowerby, 1903.

***Spondylus candidus* Lamarck, 1819**
(Fig. 2A-H)

Spondylus candidus Lamarck, 1819: 188.

Spondylus candidus Lamarck: Chenu, 1845: pl. 12, fig. 4; Sowerby II, 1848: figs 3-5; Reeve, 1856: sp. 2; Fulton, 1915: 358, sp. 74; Springsteen & Leobrera, 1986: pl. 92, fig. 6; Lamprell, 1986: pl. 25, fig. 3a-b; Lamprell & Kilburn, 1995: 91, figs d-e (as *flabellum*); Lamprell, 1998: pl. 3, figs 9-11.

Spondylus hawaiiensis Dall, Bartsch & Rehder, 1938: 100.

TYPE MATERIAL. HOLOTYPE: MNHN, Lamarck Collection. (Lamprell, 1986: pl. 3, fig 9); Holotype of *Spondylus hawaiiensis*, USNM337515. OTHER MATERIAL. KL coll, 1 pv, Koko Crater, Hawaii, attached under boulder at 22m, 1996, Chris Takahashi; KL coll, 1

FIG. 1. A-F. *Spondylus multimuricatus* Reeve, 1856. A-C, lectotype herein selected, BMNH1998093/1, Philippine Islands. A, external view lv. B, internal view rv. C, ventral view pv; height 69.3mm, width 63mm, depth of pv 36.3mm. D-F, paralectotype herein selected BMNH1998093/2, Philippine Islands. D, external view lv. E, internal view rv. F, ventral view pv; height 74.0mm, width 66.0mm, depth of pv 48.0mm. G-L, *Spondylus swinneni* sp. nov. G, holotype, AMSC303105, Philippine Islands, external view lv. H-J, KL coll, 1 pv, Boncgi Wreck, Solomon Islands. H, internal view rv. I, ventral view pv. J, external view lv; height 27.0m. K-L, paratype, QMMO66961, 1 pv, off corals, Finger Reef, Swains Reef, Qld, 18m. K, internal view rv. L, external view lv.

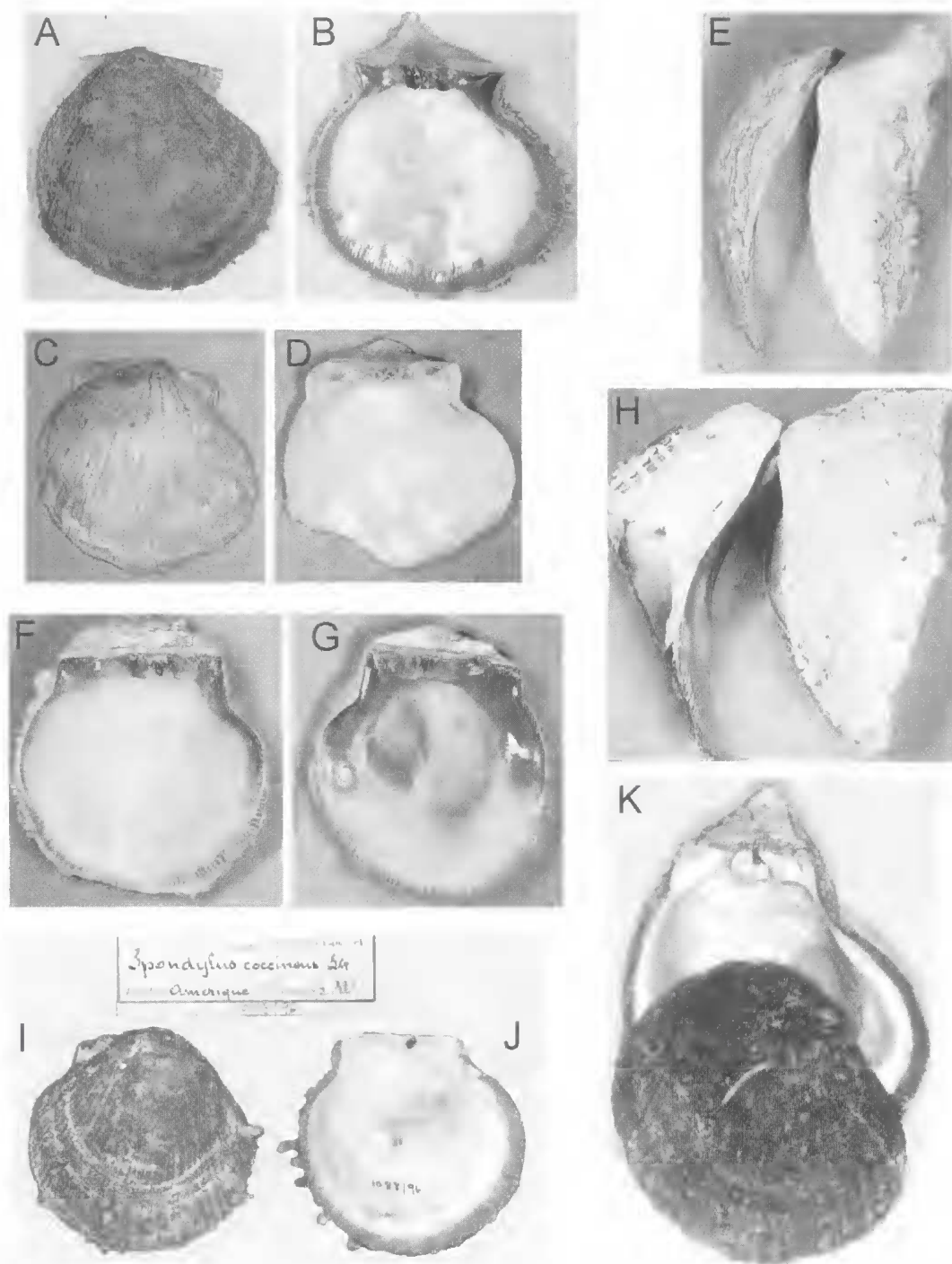


FIG. 2. A-H. *Spondylus candidus* Lamarck, 1819. A,B, KL coll, 1 pv, SW side Cassin I., N of Broome, WA, 13m. A, external view lv. B, internal view rv. C-E, KL coll, 1 pv, Koko Crater, Hawaii, 17m. C, external view lv. D, internal view rv. E, ventral view pv. F-H, KL coll, 1 pv, Oahu, attached under ledge on ceiling, 18m. F, internal view lv. G, internal view rv. H, ventral view pv. I,J, 1 pv, MHNG1088/96, specimen labelled '*Spondylus coccineus* Lk Type locality Amérique? Chenu 15/3 No 11'. I, external view lv. J, internal view rv. K, 1 pv, MNHN, specimen labelled '*Spondylus coccineus* Lam nomme par Lamarck', external view lv and view of hinge of rv.

pv, Oahu, attached under ledge on ceiling, 20m, 1999, Chris Takahashi; KL coll, 1 pv + attached pv juvenile, Hakeiwa, Oahu, attached under ledge at c.20m, 1999, Chris Takahashi; KL coll, 1 pv, inside lagoon, Pt Havau, Moorea, Tahiti; KL coll, 1 pv, SW side Cassini I., N of Broome, 13m, WA, P. Clarkson.

TYPE LOCALITY. Nouvelle-Hollande [= Australia].

DISTRIBUTION AND HABITAT. Mozambique-South Africa, Japan (as *S. flabellum*) and Indo-West Pacific, Hawaii, Qld, north WA; common under dead coral slabs or on the under faces of huge living *Porites* coral colonies also occurs in marine caves or on the walls of shipwrecks in 1-40m.

REMARKS. While we have been unable to obtain the holotype of *Spondylus hawaiiensis*, Kay (1979) synonymised it with *S. tenebrosus* Reeve, 1856 (= *S. violaceus* Reeve, 1856). Specimens of *S. hawaiiensis* sent by Mr Chris Takahashi for examination, after cleaning, proved to be inseparable from *S. candidus*. Further examination of specimens of *S. hawaiiensis* in the collection of one of the authors (KL) has led us to conclude that these two species are the same.

***Spondylus punicus* Bernard, Cai & Morton, 1993**
(Fig. 21-K)

Spondylus punicus Bernard, Cai & Morton, 1993: 55 (nom. nov. for *Spondylus coccineus* Lamarck, 1819, non Schreibers, 1793).

Spondylus coccineus Lamarck, 1819: 190, non Schreibers, 1793.

Spondylus coccineus Lamarck; Chenu, 1845: pls 14, 15 (not pl. 25, fig. 2); Reeve, 1856: sp. 44; Fulton, 1915: 336, sp. 31; Lamprell, 1986: 70, fig. 1.

Spondylus coccineus var. *vaillanti* Jousseaume (in Lamy), 1927: 301.

DISTRIBUTION AND HABITAT. Indian Ocean, Philippines, South and east China to Okinawa (Bernard, Cai & Morton, 1993); attached to corals in moderately deep water.

REMARKS. *Spondylus coccineus* Lamarck (non Schreibers, 1793) was briefly described by Lamarck (188: 11) without a stated locality. Examination of the Lamarck specimen marked '*Spondylus coccineus* (pl. 2, fig. 11)' in the MNHN showed a pear-shaped spondylid with narrow, oblique auricles and dense radial ribs devoid of ornamentation, probably due to age and deterioration; internally off-white with a raised crenulate, dark coloured margin. A specimen marked '*Spondylus coccineus* Lk Type' (pl. 2, fig. 9-10) with the locality 'Amérique?' Chenu

15/3 No 11, registration number 1088/96 is in the collections of the MHNG. This specimen is ovate, with wide interstices and strong, sparse spines on the 5 or 6 principal ribs. The specimen is tan-brown in colour with a light orange coloured internal crenulated margin. The specimen bears a strong resemblance to *S. gilvus* Reeve, 1856. In our opinion both *S. coccineus* type specimens are of doubtful status. Bernard, Cai & Morton (1993) introduced the replacement name *S. punicus* for this species. They recorded the species as occurring in China but gave no reference to the specimen(s) on which they based their identification.

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